Appendices

Appendix A

Public Involvement Summary

Appendix A Contents

Note: Appendix A includes all public involvement materials for the Chickamauga and Chattanooga National Military Park Traffic Impact Study and Subarea Transportation Plan. The contents of Appendix A are summarized above. Due to its large size, Appendix A is not included in this document. A copy of Appendix A is available from the Georgia Department of Transportation Office of Planning.

Appendix B

Model Output

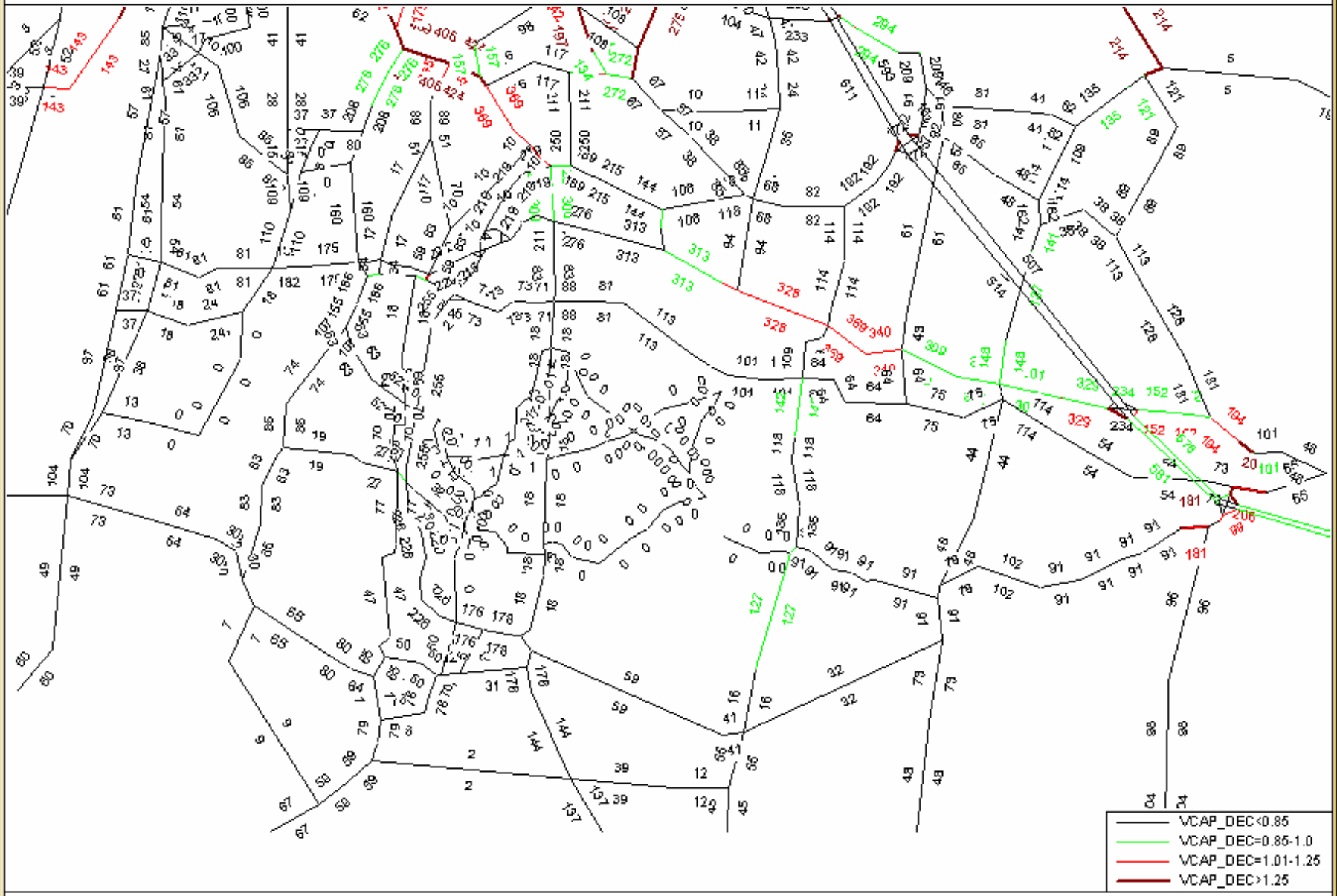
Print PreView

CCNMP Transportation Study

2025 Gate Closures at Jay's Mill, Wilder, Long Hollow, & NW Lytle, and Alexander Bridge Road (only Osburn/SW Lytle remains open)

Volume-to-Capacity Ratio Bandwidth with Total Volumes (in 100s)

3/19/2004 D:\Chattanooga\2025 Alternatives\Alt 16-Gate Closures\CH2522.DAT



Viper Software by The Urban Analysis Group

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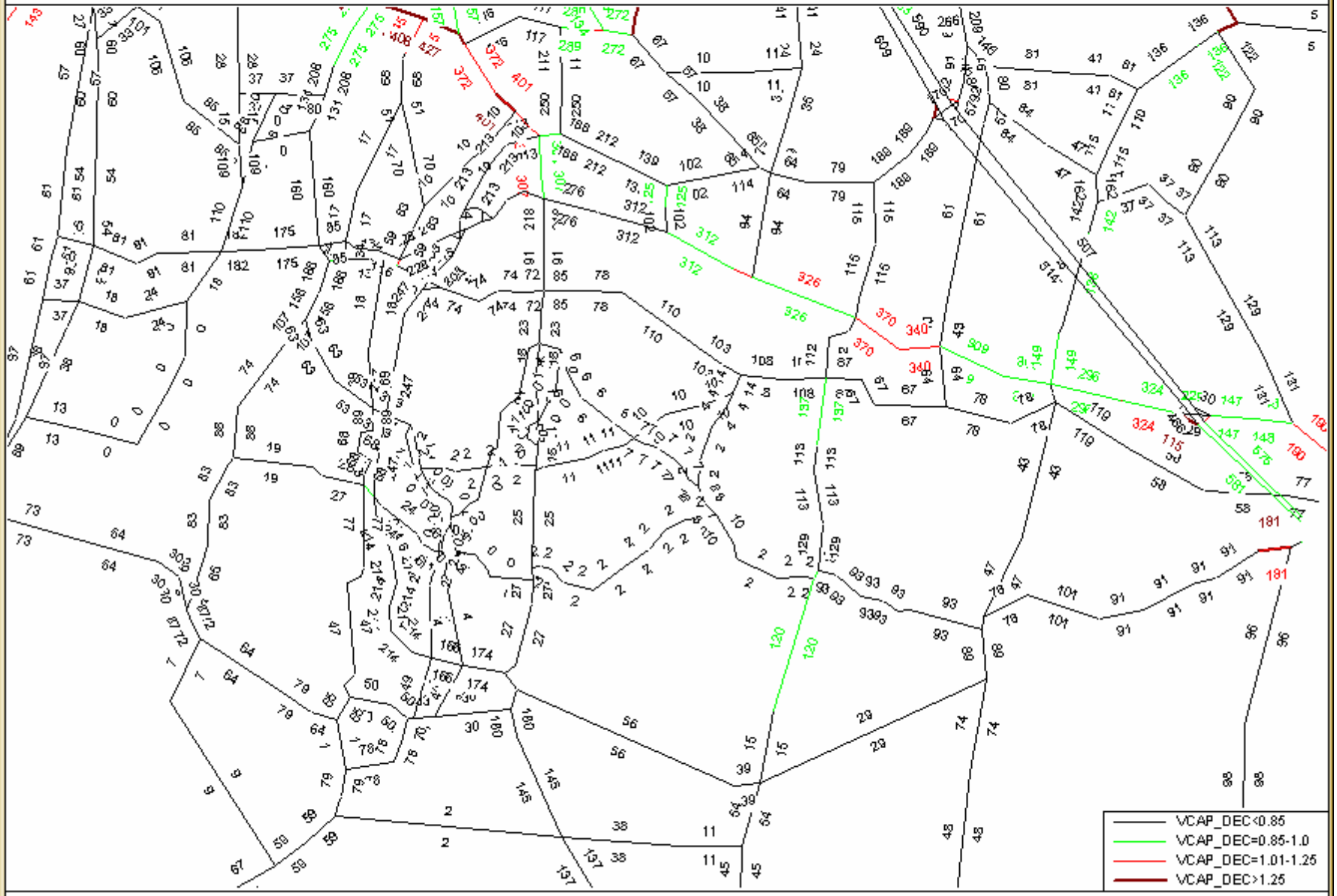
Print PreView

CCNMP Transportation Study

2025 LRTP Base Alternatives Network - McFarland Gap as 2 Total Lanes (Alternative 1,2) - PARK VISITATION DOUBLED

Volume-to-Capacity Ratio Bandwidth with Total Volumes

3/19/2004 D:\Chattanooga\2025 Alternatives\No-Build-Park Doubled\CH2522.DAT



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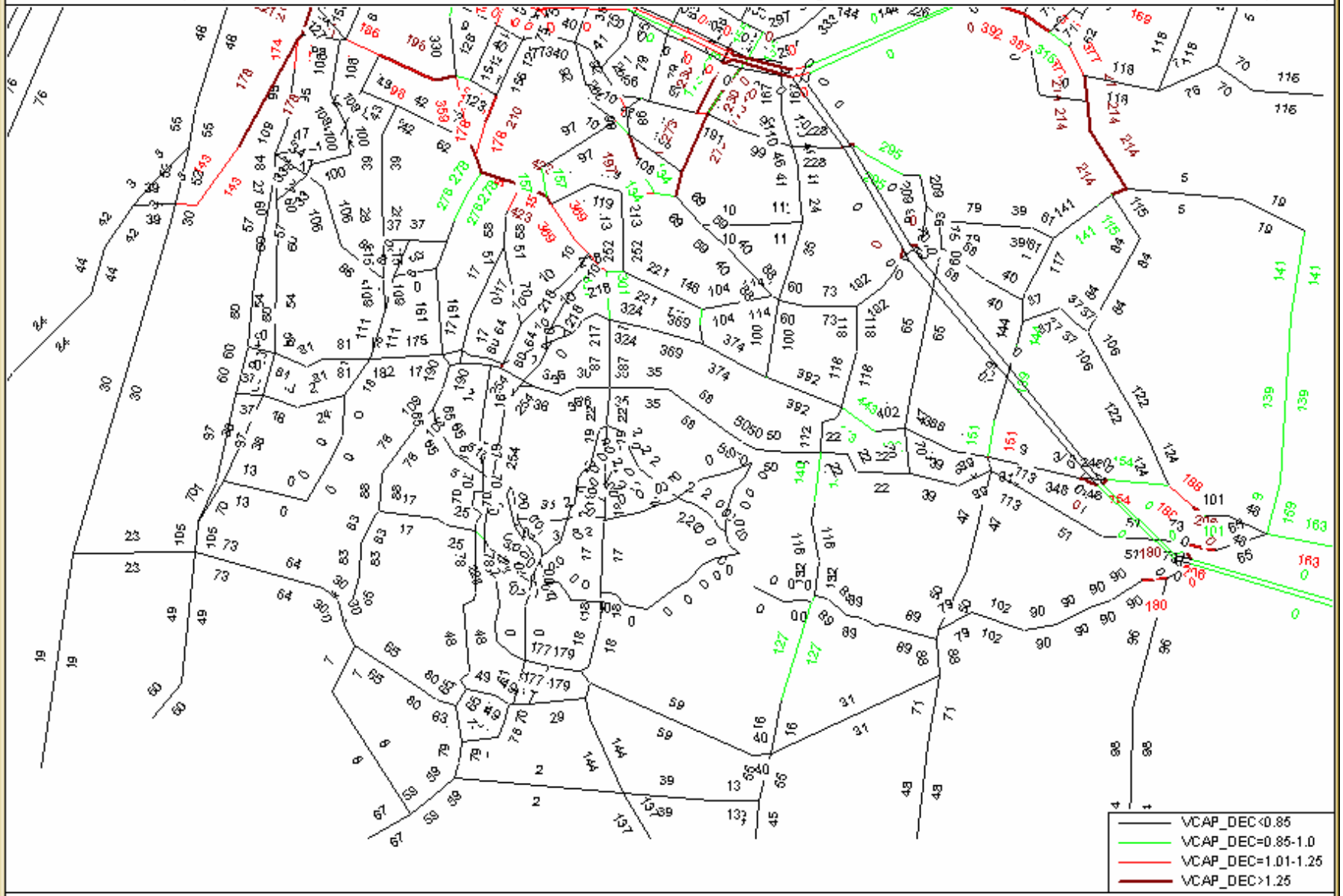
Print PreView

CCNMP Transportation Study

2025 Build Alternative with Park Visitation Doubled

(Includes Cloud Springs as 4 Lanes, US 27 Ext. to Cloud Springs, Battlefield Pkwy. as 6 Lanes, One-Way Loop, Gate Closures)

Volume-to-Capacity Ratio Bandwidth with Total Volumes (in 100s) (3/19/2004 D:\Chattanooga\2025 Alternatives\Build-Park Doubled\CH2522.DAT)



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Appendix C

Strategies No Longer Under Consideration

Strategies No Longer Under Consideration

Strategy Description	**I-2: Extension of US 27 from SR 2/Battlefield Parkway to LaFayette Road/Chickamauga Avenue using Dewberry Road and Hogan Road.**
Need and Purpose or Justification	This strategy was proposed as an alternative to strategy *I-1: Extension of US 27 from SR 2/Battlefield Parkway to SR 146/Cloud Springs Road* which had been identified in the Chattanooga 2025 Long Range Transportation Plan. The purpose of this improvement is to provide a better northern connection for the US 27 relocation and ultimately to alleviate existing and projected congestion on LaFayette Road north of SR 2. It was expected that this strategy would also reduce non-Park traffic inside the Battlefield due to a better connection to the north and avoidance of congestion at the SR 2 and LaFayette Road intersection.
Primary Impacts	This strategy was tested in the refined Chattanooga MPO travel demand model for 2025. As modeled, this project lowered future traffic volumes along LaFayette Road north of SR 146/Cloud Springs Road from 37,700 vehicles per day (vpd) to 29,200 vpd, which would consequently lower the volume to capacity (v/c) below 1.0. Future traffic south of SR 146/Cloud Springs Road decreased only 2,800 vehicles per day (vpd) versus the 10,000 vpd reduction with Strategy I-1. Future traffic volumes are expected to increase on SR 2/Battlefield Parkway, west of the SR 2, LaFayette Road, US 27 intersection from 19,100 vpd to 30,600 vpd. This strategy increases traffic volumes on US 27 through downtown Rossville. Within the Chickamauga Battlefield, future traffic volumes on LaFayette Road are shown to decrease from 3,800 vpd to 1,500 vpd.
Reasons for Dismissal	Compared to strategy I-1, this strategy increases future traffic volumes more on SR 2/Battlefield Parkway and on US 27 in Rossville, lowering its relative capacity benefits. It has the potential to cause a much greater negative impact on residents and cultural and natural resources. The topography along the proposed facility corridor would prove more difficult for widening from two to four lanes.

Strategy Description	**I-3: Widen LaFayette Road/Chickamauga Avenue from SR 146 to 37th Avenue in Chattanooga, Tennessee from four to six lanes.**
Need and Purpose or Justification	This strategy was proposed to alleviate existing and projected congestion on LaFayette Road north of SR 2/Battlefield Parkway to Chattanooga.
Primary Impacts	This strategy was tested in the refined Chattanooga MPO travel demand model for 2025. As modeled, this project appears to reduce congestion along much of the corridor. Without this capacity addition, v/c ratios on LaFayette Road/Chickamauga Avenue range from 1.2 to 1.8. With this capacity addition, v/c ratios drop to a range of 0.8 to 1.3. Congestion remains at the intersection with McFarland Avenue in Rossville. Traffic volumes are projected to increase on the US 27 relocation and decrease along Mission Ridge Road and Lytle Road. This project does not have measurable impact on traffic volumes inside the Battlefield.
Reasons for Dismissal	Though this strategy could alleviate some congestion in the LaFayette Road/Chickamauga Avenue corridor as a major travel route to Chattanooga, the benefits are outweighed by costs. This strategy would negatively impact the adjacent communities, natural resources, and would be very costly to implement.

Strategy Description	**I-6: Widen Three Notch Road from US 41 to Boynton Road from two to four lanes and Red Belt Road from Burning Bush Road to US 27 from two to four lanes to facilitate north-south movement east of the Battlefield.**
Need and Purpose or Justification	This strategy was proposed to improve north-south connectivity east of the Battlefield. Projected future residential growth east and southeast of the Battlefield has the potential to generate additional traffic on roads through the Battlefield unless local residents have better north-south travel routes to SR 2/Battlefield Parkway and Fort Oglethorpe. By improving the north-south connection, it is thought local traffic would have a better way to travel using roads other than those that pass through the Chickamauga Battlefield.
Primary Impacts	This strategy was tested in the refined Chattanooga MPO travel demand model for 2025. As modeled, this project attracts only a slight increase in future traffic. It did not have any discernable impact on traffic volumes on roads within the Chickamauga Battlefield.
Reasons for Dismissal	This strategy does not appear to fulfill its purpose of diverting future traffic away from the Chickamauga Battlefield roads. A widening project of this magnitude would also have negative impacts on the natural resources in the area and be costly. Stakeholders expressed concern that any eastern "bypass" would continue to erode traffic to the Fort Oglethorpe/LaFayette Road business district. As initially proposed, this strategy will no longer be considered.

Strategy Description	**I-7: Construct a new two-lane minor arterial roadway from US 27 south of the Chickamauga Battlefield to SR 2/Battlefield Parkway near Beaver Road intersection, between the eastern Chickamauga Battlefield boundary and Burning Bush Road.**
Need and Purpose or Justification	Like strategy *I-6: Widening Three Notch Road and Red Belt Road*, this strategy was proposed to improve north-south connectivity east of the Battlefield. Projected future residential growth east and southeast of the Battlefield has the potential to generate additional traffic on roads through the Battlefield unless local residents have better north-south travel routes to SR 2/Battlefield Parkway and Fort Oglethorpe. By constructing a new north-south connection, local traffic would have a better travel route to Fort Oglethorpe and SR 2/Battlefield Parkway rather than using roads through the Chickamauga Battlefield.
Primary Impacts	This strategy was tested in the refined Chattanooga MPO travel demand model for 2025. As modeled, this project appears to reduce nearly all non-Park traffic on roads on the eastern side of the Battlefield. With this strategy, traffic volumes are projected to decrease on LaFayette Road through the Battlefield by 1,000 vpd, decrease on Burning Bush Road by 2,000 vpd, and decrease on US 27 relocation by 3,000 vpd. Negative impacts of this strategy include its environmental and community impacts. Much of the land between the eastern Battlefield boundary and Burning Bush Road lies within the West Chickamauga Creek floodplain and watershed. Consequently, the environmental impacts of new construction would likely be costly and difficult to mitigate. This strategy also has the potential to negatively impact view sheds of the Battlefield and the local community. Stakeholders expressed concern that any eastern "bypass" would continue to erode traffic to the Fort Oglethorpe/LaFayette Road business district.
Reasons for Dismissal	Though a new north-south roadway east of the Battlefield has the potential to draw traffic off of Park roads, the environmental and community costs would outweigh its benefit. Two eastern alignments of the US 27 relocation were originally considered in the environmental impact statement for the relocation of US 27, but they were dismissed due to negative environmental impacts. Preservation of right-of-way along the east side of the Battlefield for some type of corridor, not necessarily passenger automobile, could be considered for implementation beyond the year 2025.

Strategy Description	**II-3: Widen McFarland Gap Road from Mission Ridge Road to LaFayette Road from two to four lanes.**
Need and Purpose or Justification	This strategy was proposed by stakeholders to improve connectivity between the US 27 relocation and the Fort Oglethorpe/LaFayette Road business district. It is thought that a McFarland Gap Road widening would increase traffic through the Fort Oglethorpe/LaFayette Road business district. This project was also included in the original, unrefined Chattanooga MPO travel demand model provided for the study.
Primary Impacts	This strategy was tested in the refined Chattanooga MPO travel demand model for 2025. As modeled, this project is projected to increase traffic volumes at the US 27 relocation/McFarland Gap Road interchange from 4,400 vpd to 6,700 vpd, an increase of 2,300 vpd over a no-build condition. Volumes south of McFarland Gap Road on the US 27 relocation are projected to increase by 2,200 vpd. This would increase the v/c ratio on the US 27 relocation to 0.85.
Reasons for Dismissal	A majority of McFarland Gap Road between the US 27 relocation and LaFayette Road is within the Chickamauga Battlefield boundaries. A widening would negatively impact the Battlefield's historic, cultural, and natural landscape. In addition, this project would conflict with CCNMP policies and goals and detract from the desired visitor experience. One Park strategy is to change the orientation of visitor center access from LaFayette Road to McFarland Gap Road. A widening would create more traffic and have the potential to create an unsafe traveling condition for visitors. Traffic control at LaFayette Road and McFarland Gap Road/Reed's Bridge Road is also a concern for the Park service. The existing and future need for better accessibility and mobility northwest of the Chickamauga Battlefield does exist, and preserving mobility along SR 2/Battlefield Parkway is essential. Fort Oglethorpe/LaFayette Road business district accessibility must be balanced with the context of the Chickamauga Battlefield and importance of McFarland Gap Road in meeting the Park's goals and objectives.

Strategy Description	**IV-14: Increase speed limit on LaFayette Road.**
Need and Purpose or Justification	This strategy was proposed to improve north-south access and increase activity on LaFayette Road north of Battlefield. Loss of through traffic and economic viability in the Fort Oglethorpe/LaFayette Road business district is cited as a major impact from the US 27 relocation by local area businesses and stakeholders.
Primary Impacts	This strategy was tested in the refined Chattanooga MPO travel demand model for 2025. As modeled, this project would increase traffic on LaFayette Road, south of McFarland Gap Road/Reed's Bridge Road from 2,200 vpd to over 12,000 vpd. Traffic volumes north of the McFarland Gap Road/Reed's Bridge Road intersection on LaFayette Road would increase from 8,700 vpd to 16,200 vpd. Volumes on the US 27 relocation dropped by half. Impacts of this strategy on the Chickamauga Battlefield are uniformly negative. Increasing traffic on LaFayette Road would be in direct conflict with the Park's purpose and objectives (see Section 1). This would also negate the need and purpose of implementing the US 27 relocation. Visitor experience would be negatively impacted since more traffic on LaFayette Road would increase the conflict between Park and non-Park users in regards to safety and resource interpretation. LaFayette Road received the highest sensitivity rating in the cultural assessment, and resources along LaFayette Road would be in greater jeopardy by an increase in travel speeds. The safety of operations on LaFayette Road would also be an issue causing concerns from two perspectives, safety of the traveling public and NPS liability.
Reasons for Dismissal	The primary reason for dismissal is that this strategy is in direct conflict with two goals established for this study, increasing the attraction of the US 27 relocation and minimizing the adverse impacts of traffic on the CCNMP resources. As modeled, traffic is diverted off the US 27 relocation which was designed to handle more traffic at higher speeds safely. Increased traffic on LaFayette Road would damage the visitor's experience and possibly damage historic and cultural resources along LaFayette Road. The secondary benefits of increased economic activity along the Fort Oglethorpe/LaFayette Road business district attributable to an increase in traffic volumes are unclear given the strong economic development focus on SR 2/Battlefield Parkway.

Appendix D

Air Quality Documentation

Comparison of Air Quality Impacts of No-Build Alternative and Build Alternative

Introduction

Until recently, the Chattanooga region was in air quality attainment and, therefore, had not been required to generate output statistics from the travel demand model to be input into an air quality model. In order to evaluate air quality impacts of the recommended strategies for the Chickamauga and Chattanooga National Military Park Traffic Impact Study and Subarea Transportation Plans, steps were added to the travel demand model utilized in this study to generate congested speed, vehicle hours traveled (VHT), and vehicle miles traveled (VMT) by area type and facility type. The comparison of these three statistics, which typically correlate with air quality emissions, between the future year (2025) No-Build and Build alternatives are discussed in this appendix to demonstrate that the modeled recommendations for the Chickamauga and Chattanooga National Military Park Traffic Impact Study and Subarea Transportation Plan do not adversely impact air quality in the Chattanooga region.

Both the future year No-Build and Build alternatives include the US 27 extension from SR 2/Battlefield Parkway to SR 146/Cloud Springs Road and the widening of SR 146/Cloud Springs Road from US 27/LaFayette Road/Chickamauga Avenue to I-75, as they are both included in the Chattanooga 2025 Long Range Transportation Plan. The only difference between the two alternatives is that the Build alternative includes the widening of SR 2/Battlefield Parkway from Cedar Lane to I-75, the proposed one-way loop on the east side of the Chickamauga Battlefield (Park), and the proposed gate closures to the Park. The proposed gate closures are at Lytle Road northwest of the Park, Long Hollow Road west of the Park, Wilder Road southwest of the Park, Alexander's Bridge Road southeast of the Park, and Jay's Mill Road northeast of the Park. Both the No-Build and Build alternatives include a doubling of Park visitation to represent a worst case scenario.

Comparison of Statistics between No-Build Alternative and Build Alternative

Table 1 provides an overall comparison of average congested speed, total VHT, and total VMT between the 2025 No-Build alternative and 2025 Build alternative. Overall, there is an improvement in congested speed and VHT with the Build alternative. However, there is a very slight increase in VMT of less than a tenth of a percent with the Build alternative. The increase in VMT with a decrease in VHT is due to the widening of SR 2/Battlefield Parkway in the Build alternative. The additional capacity enables vehicles to travel longer distances in less time.

Table 1
Overall Comparison of Average Congested Speed, Total VHT, and Total VMT

Measure	Alternative		Percent Change
	No-Build	Build	
Congested Speed	34.02	34.13	0.31%
VHT	405,431	405,995	-0.11%
VMT	15,495,309	15,504,269	0.06%

Note: Excludes Centroid Connectors

Congested Speed

Tables 2 and 3 compare congested speed by area type and facility type, respectively, for the No-Build alternative and the Build alternative. The addition of a sixth area type during the modeling process for this study, in order to change the speeds and capacities within the Park, provides the ability to also show statistics specifically for the Park, as shown in the area type tables in this document. As demonstrated in Table 2, most of the increase in the overall congested speed comes from the Park area. As shown in Table 3, most of the increase in congested speed is on collector roadways. There is a minimal decrease in congested speed on expressways, which is most likely due to the US 27 relocation. The overall increase in congested speed with the Build alternative will benefit air quality.

Table 2
Congested Speed by Area Type

Area Type	Alternative		Percent Change
	No-Build	Build	
CBD	25.15	25.16	0.04%
CBD Fringe	32.63	32.63	0.00%
Residential	33.26	33.26	0.00%
Commercial Suburban	40.56	40.68	0.30%
Rural	45.03	44.98	-0.11%
Chickamauga Battlefield Park	26.67	27.21	2.03%
Overall	**34.02**	**34.13**	**0.33%**

Note: Excludes Centroid Connectors
CBD - Central Business District

Table 3
Congested Speed by Facility Type

Facility Type	Alternative		Percent Change
	No-Build	Build	
Interstate	52.59	52.63	0.08%
Expressway	45.89	45.77	-0.26%
Principal Arterial, 4-lane	35.10	35.21	0.31%
Principal Arterial, 2-lane	36.46	36.48	0.06%
Collector	30.25	30.47	0.73%
Minor Arterial	33.46	33.40	-0.18%
Ramp	21.02	21.01	-0.05%
Overall	**34.02**	**34.13**	**0.32%**

Note: Excludes Centroid Connectors

Vehicle Hours Traveled (VHT)

Tables 4 and 5 compare VHT by area type and facility type, respectively, for the No-Build alternative and the Build alternative. Like congested speed, VHT also improves with the Build alternative. Although there is an overall net decrease of 436 in VHT with the Build alternative, there is almost a decrease of 1,100 VHT in the residential areas, most likely those east of the Park. As demonstrated in Table 5, most of the decrease in VHT is on minor arterials and collector roadways.

Table 4
Vehicle Hours Traveled by Area Type

Area Type	Alternative		Percent Change
	No-Build	Build	
CBD	9,851	9,867	0.16%
CBD Fringe	70,711	70,654	-0.08%
Residential	188,068	186,976	-0.58%
Commercial Suburban	77,057	77,533	0.62%
Rural	59,250	59,308	0.10%
Chickamauga Battlefield Park	494	657	33.00%
Total	**405,431**	**404,995**	**-0.11%**

Note: Excludes Centroid Connectors

Table 5
Vehicle Hours Traveled by Facility Type

Facility Type	Alternative		Percent Change
	No-Build	Build	
Interstate	130,324	130,403	0.06%
Expressway	46,379	46,399	0.04%
Principal Arterial, 4-lane	56,619	57,125	0.89%
Principal Arterial, 2-lane	34,135	34,143	0.02%
Collector	41,621	41,478	-0.34%
Minor Arterial	92,670	91,791	-0.95%
Ramp	3,683	3,656	-0.73%
Total	**405,431**	**404,995**	**-0.11%**

Note: Excludes Centroid Connectors

Vehicle Miles Traveled (VMT)

Tables 6 and 7 compare VMT by area type and facility type, respectively, for the No-Build alternative and the Build alternative. Unlike congested speed and VHT, overall VMT does not improve with the Build alternative. However, this is not surprising considering the widening of SR 2/Battlefield Parkway in the Build alternative makes travel more efficient, thereby increasing VMT yet decreasing VHT. However, it should be noted that there is a shift of over 30,000 in VMT from the residential areas to the commercial suburban areas. This minimal overall increase in VMT of less than one tenth of a percent should not adversely impact air quality in the

Chattanooga region. Table 7 also demonstrates a shift in VMT from minor arterials to principal arterials, again due to the widening of SR 2/Battlefield Parkway.

Table 6
Vehicle Miles Traveled by Area Type

Area Type	Alternative		Percent Change
	No-Build	Build	
CBD	279,416	279,750	0.12%
CBD Fringe	2,430,266	2,429,002	-0.05%
Residential	6,490,630	6,459,433	-0.48%
Commercial Suburban	3,384,104	3,416,316	0.95%
Rural	2,897,179	2,899,981	0.10%
Chickamauga Battlefield Park	13,714	19,787	44.28%
Total	**15,495,309**	**15,504,269**	**0.06%**

Note: Excludes Centroid Connectors

Table 7
Vehicle Miles Traveled by Facility Type

Facility Type	Alternative		Percent Change
	No-Build	Build	
Interstate	6,230,426	6,233,408	0.05%
Expressway	2,200,341	2,201,330	0.04%
Principal Arterial, 4-lane	1,946,513	1,982,683	1.86%
Principal Arterial, 2-lane	913,262	912,774	-0.05%
Collector	1,222,455	1,219,164	-0.27%
Minor Arterial	2,920,992	2,893,662	-0.94%
Ramp	61,320	61,247	-0.12%
Total	**15,495,309**	**15,504,268**	**0.06%**

Note: Excludes Centroid Connectors

Conclusion

In conclusion, based on a review of congested speeds, VHT, and VMT, it can be determined that air quality is not adversely impacted with the proposed Build alternative. As shown above, both congested speed and VHT improve with the Build alternative. The increase in VMT is minimal. The results demonstrated a shift in congested speed and VHT from residential areas to commercial suburban areas and a shift in VMT from minor arterial roadways to principal arterial roadways.